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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,958	11/25/2003	Simon R. Kelemen	RDH-0319	5905

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EXAMINER	
ROGERS, DAVID A	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,958	KELEMEN ET AL.	
	Examiner	Art Unit	
	David A. Rogers	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent 5,492,005 to Homan *et al.* in view of "Heavy Fuel Oils - Product Dossier 98/109" to CONCAWE and "Pollutant Formation and Interaction in the Combustion of Heavy Liquid Fuels" to de Blas.

Homan *et al.* teaches an apparatus and method for determining the presence of deposits of fuels or fuel additives. Specifically, Homan *et al.* teaches "[t]he present invention relates to a system for rating fuel and/or fuel additives for their tendency to form and mitigate deposits on solid surfaces." Homan *et al.* specifically addresses simulating engine intake systems. However, Homan *et al.* also teaches "[o]ther operating conditions can provide emulation of other deposit formation conditions." Clearly, Homan *et al.* is not restricted to only fuel intake temperatures.

The apparatus of Homan *et al.* comprises solid nub (reference item 1) with a deposit surface (not labeled); means for controlling the magnitude and duration of the temperature of the deposit surface, that being a surface

temperature programmer (reference item 7) and transformer (reference item 13); and means for introducing fuel and/or fuel containing additives onto the deposit surface, that being a syringe pump (reference item 4). Homan *et al.* teaches that the programmable temperature controller is beneficial as it helps to replicate the actual operating conditions of the fuels (column 2, lines 15-18, lines 45-46). Homan *et al.* further teaches the use of a molecular sieve (reference item10) along with a dryer (reference item 11) and a flow meter (reference item 12) that provides a controlled gas environment to an enclosure (reference item 6). The combination of controlled gas quality and controlled temperature provides for a well-controlled and maintained environment within the enclosure.

Homan *et al.* teaches an intended use for fuels and/or fuel additives and does not expressly teach the use of refinery feedstocks. The applicant defines refinery feedstocks as, for example, coker gas oils, catalytic cycle oils, atmospheric gas oils, coker napthas, catalytic napthas, steam cracked napthas, feedstock mixtures, and the like (page 1, lines 9-12). This is only a small listing of commonly used/available fuel oils. Refinery feedstocks and fuels for internal combustion engines are, generally, hydrocarbon-based materials extracted from wells. After refining these materials are converted to several forms for specific uses. Generally, these refined hydrocarbons are used as fuels for engines or other devices. In this regard, it would be obvious to replace the fuel/fuel additives, as taught by Homan *et al.*, with refinery

feedstocks in order to determine if they, too, exhibit deposit-forming characteristics. Homan *et al.* also does not teach controlling the temperature of the nub so as to emulate a refinery surface.

The applicant argues that the nub will be heated to between 150 °C to 300 °C, or to just below 350 °C. At this range the applicant states that the temperatures are too low to form coke during the relatively short time of the test. It is important to note that the applicants do not claim any specific time range and temperature range for the testing of feedstocks.

CONCAWE teaches several heavy fuel oils and their boiling points. In particular, heavy fuel oils and their boiling points are listed, some of which are recited here.

EINICS No.	***Name***	***Boiling Point***
265-063-0	Distillates (petroleum), heavy catalytic cracked	260 °C - 500 °C
265-082-4	Distillates (petroleum), heavy thermal cracked	260 °C - 480 °C
265-162-9	Gas oils (petroleum), hydrotreated vacuum	230 °C - 600 °C
265-193-8	Residues (petroleum), steam-cracked	~ 260 °C
269-777-3	Residues (petroleum), atmospheric	~ 200 °C
269-783-6	Distillates (petroleum), hydrodesulfurized intermediate catalytic cracked	205 °C - 450 °C
269-784-1	Distillates (petroleum), hydrodesulfurized heavy catalytic cracked	260 °C - 500 °C
270-796-4	Residues (petroleum), heavy coker gas oil and vacuum gas oil	~ 230 °C
270-983-0	Residues (petroleum), heavy coker and light vacuum	~ 230 °C
270-984-6	Residues (petroleum), light vacuum	~ 230 °C
271-013-9	Residues (petroleum), steam-cracked light	101 °C - 555 °C
272-184-2	Gas oils (petroleum), heavy atmospheric	121 °C - 510 °C
274-683-0	Distillates (petroleum), intermediate vacuum	250 °C - 545 °C
274-683-6	Distillates (petroleum), light vacuum	250 °C - 545 °C
274-685-1	Distillates (petroleum), vacuum	270 °C - 600 °C

EINICS No.	***Name***	***Boiling Point***
295-511-0	Residues (petroleum), catalytic cracking	~ 200 °C
295-990-6	Distillates (petroleum), intermediate catalytic cracked, thermally degraded	220 °C - 450 °C
308-733-0	Residues, steam cracked, thermally treated	~ 180 °C
309-863-0	Distillates (petroleum), hydrodesulfurized full-range middle	150 °C - 400 °C

In response to the applicant's argument above, the desired temperature range covers the temperatures at many heavy fuel oils boil. Clearly, from the teachings of CONCAWE, it is known to have fuel oils that will evaporate at the temperature range between 150 °C - 300 °C. When evaporation occur any solids in solution will be left behind as solids on the surface. Clearly it is within the scope of one of ordinary skill to modify the teachings of Homan *et al.* to test a different hydrocarbon-based fluid, such as refinery feedstocks, for the presence of deposits by holding the nub surface at a temperature that emulates the expected operating conditions, such as one in a refinery, i.e. at an operating temperature between 150 °C - 300 °C. If the area of interest, i.e. the refinery surface, does not experience the temperatures required to combust fuel oils or otherwise produce carbon deposits from the fuel oils then there would be no need to test at those elevated temperatures. All that is needed is the lowering of the temperature to emulate a different environment (as expressly taught by Homan *et al.*).

However, in the event that Homan *et al.*, alone or in combination with CONCAWE, does not make obvious the use of and testing of refinery feedstocks, de Blas teaches that it is known to test fuel oils for the presence of

particulates or the presence of deposits. In the Abstract of de Blas it is stated that "[d]ecreasing quality and stricter environmental regulations impose potential limitations to the use of heavy fuel oils in combustion and they often produce carbonaceous particulates." de Blas also states "[t]he fuels investigated are by-products of refining operations, and can be differentiated in two groups, namely heavy vacuum gas oils and heavy coker gas oils" (Objective, page 5). de Blas defines carbon residue a "[a] measure of the quantity of solid deposits formed when medium or heavy oils are heated so that evaporation and pyrolysis take place. Carbon residue tests provide an indication of the extent of carbon formation which may be expected in real operation. Carbon residue formation can be estimated by:

> Ramsbottom Carbon Residue of Petroleum Products (ASTM Designation D 524-88): A weighed sample in a glass bulb with a capillary opening is placed inside a metal furnace at approximately 550 °C. The sample is quickly evaporated from the bulb, leaving the heavier residue behind to undergo cracking and coking reactions in the presence of air. The Ramsbottom Carbon Residue is reported as the weight percentage of original sample remaining and therefore it includes ash in the value.

In all, de Blas recognizes the fact that fuel oils, such as the types described by the applicants, may cause deposits to form. de Blas further teaches that a test similar to that of the Homan *et al.* can be used to determine the formation and of the deposits by a change in weight of a glass bulb.

The applicant further argues that the present invention does not test for the presence of deposits. This is not correct. The applicant is reminded of the preamble and step (c) of amended claim 1 where it is stated "...determine the conditions for refinery feed stocks...for the formation...of deposits..." and

"...weighing said solid before and after said introducing step to determine the amount of deposit onto said surface." Clearly, the claim language shows that the applicant is claiming a method of testing for the presence of deposits.

It is known from Homan *et al.* to test fuels and fuel additives for deposits under actual operating conditions, i.e. exposing a surface to actual operating conditions. One can easily vary the temperature in order o to emulate other operating conditions, such as a refinery surface temperature. Furthermore, one can easily vary the temperature to determine if there is a condition at which minimal deposits occur so that the engine's operating condition can be controlled in order to obtain this minimum condition. Likewise, knowing the conditions at which refinery feedstocks form deposits will also allow one to monitor the refinery's operation in order to obtain this minimum condition. As a corollary, one can rate the fuel and/or fuel additive as unusable for the refinery's operation or for the engine due to excessive deposit formation.

The limitations of the applicant's claim 2 are found in claims 3, 8, and 11 of Homan *et al.* The limitations of the applicant's claim 3 are found in claims 3 and 11 of Homan *et al.* The limitations of the applicant's claim 4 are found in claim 6 of Homan *et al.* The limitations of the applicant's claim 5 are found in claim 9 of Homan *et al.* With regard to claim 6, Homan *et al.* discloses the applicant's invention except for the express use of an inert gas such as nitrogen. Homan *et al.* states that their device can be used with air or any other desired gas (column 2, lines 23-25). See also claim 12 of Homan *et al.*

Similarly, the applicant discloses on page 3, lines 21-23 that air, or any other desired gas could be used. The applicant's choice of an inert gas to possibly emulate specific conditions or to test in at atmosphere free of reactive materials (nitrogen, for example, is inert) would have been an obvious choice to one of ordinary skill. In the art of testing it is well known, and it is generally accepted practice to simulate the actual working conditions of a material. As such, and in view of the fact that both Homan *et al.* and the applicants teach the use of any gas, using an inert gas would have been an obvious choice.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hamon *et al.* with the teachings of de Blas in order to obtain a method to determine the conditions for refinery feed stocks for the formation and mitigation of deposits using a heated nub whose temperature can be controlled, a fuel delivery pump, and an inert gas that better simulates the actual working conditions of the fuel.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Rogers whose telephone number is (571) 272-2205. The examiner can normally be reached on Monday - Friday (0730 - 1600).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on (571) 272-2208.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dar
18 October 2004

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